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OUR ENGLISH PAGE

New Views on the Universe. (2)

(新しい宇宙觀)

The Sun and Planets.

So far mathematical analysis, omitted in this summary, and observation confirm a theory of evolutionary cosmogony which seems to fit the greater part of the stellar universe. But our system of sun and planets did not fit into the scheme; they could be explained only on the supposition that our sun after its condensation from the arm of a nebula, had encontered a gravitational influence from without sufficient to prevent its following the normal procedure of twinning, and of such a kind as to produce the satellary planets with their own satellites. Dr. Jeans found no difficulty in calculating and describing the nature of the approach of a star wuich could thus have been the external parent of our solar system. But, last spring, he was constrained to state that the probabilities drawn from the observed distribution of the stars were heavily against the occurrence of a sufficient external influence within the time given by theory. If our solar system did arise in that fashion, and there was on better existing theory than the tidal influence of a star in what passes for neighbourhood in stellar space, it was possibly a unique event in stellar cosmogony.

Since then Professor Eddington, by another remarkable combination of theory and obser-ation, has found that the luminosity of a star depends almost wholly on its mass. All the stars as massive as Sirius have the luminosity of Sirius, and stars as massive as our sun have the luminosity of our sun. But stars have not an unlimited store of energy, and if they go on radiating at their present rate they must lose in mass. This rate can be calculated. Our sun, for example, after 1,500,000 years will have lost 10 per cent. of its mass and 30 per cent. of its luminosity. The radius of the earth's orbit will then be ten-ninths of its present size, and our year will have expanded to 451 days. The whole universe of stars must be thought of as expanding in the same fashion. When in the past the average star had four times its present size the stars must have been 64 times as closely packed, and therefore have had 64 times as much chance of interfering with their neighpours.

The view has increased the time scale prodigiously. Formerly calculation assigned a duration in the past of about 10,000 million years to the universe. The new scale reaches to millions of million years. What was highly improbable on the older calculation of time and estimation of distance has now become probable. With a more closely packed universe in existence for an enormously greater period of time, the formation of planetary systems like those of our sun may have been a normal event. It has always been recognized that even if they existed in the nearest stars, they would be far too small for our range of vision.